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10/566,909	02/03/2006	Tsunemori Yoshida	57A 3811 PCT	4567

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EXAMINER
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CANTELMO, GREGG

ART UNIT	PAPER NUMBER
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1795

MAIL DATE	DELIVERY MODE
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06/05/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/566,909	<b>Applicant(s)</b> YOSHIDA, TSUNEMORI	
	<b>Examiner</b> Gregg Cantelmo	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/3/06</u> .  | 6) <input type="checkbox"/> Other: ____.                          |

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

### ***Information Disclosure Statement***

2. The information disclosure statement filed February 3, 2006 has been placed in the application file and the information referred to therein has been considered as to the merits.

### ***Drawings***

3. The drawings received February 3, 2006 are acceptable for examination purposes.

### ***Specification***

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the specification recites that the graphite nuclear contains fixed carbon and wherein the fixed carbon is more than 98% but it is not clearly disclosed that the fixed carbon is solid carbon. Clarification is respectfully requested

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

Art Unit: 1795

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 2 and 3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. The ranges of claims 2 and 3 are not clearly defined. The ranges are disclosed and claimed as what appears to be approximate ranges. This is evidenced by the use of “~” between the limits of the ranges. However the specification fails to set forth the exact bounds of the approximate ranges or what values can fall within or are excluded from the approximate ranges. Applicant is advised to refrain from using the symbol “~” between the ranges of claims 2-3.

b. The term “solid carbon” of claim 2 is not particularly clear. When referring to the graphite nuclear containing more than 98% carbon, the disclosure refers to the carbon as “fixed” carbon and not “solid” carbon. The terms fixed and solid are not synonymous and coextensive in scope and do not appear to be able to be used interchangeably. Applicant is advised to replace the term “solid” with “fixed” to overcome this rejection.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Art Unit: 1795

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-6 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by JP 2003-317733 (Yoshida).

Yoshida discloses a forming material of separator for fuel cell, characterized in that said forming material is comprised of an aggregation of granular composites, wherein each granular composite is a graphite nuclear coated by a coating layer consisting of hardening resin and carbon nano-substance (abstract and Fig. 3 as applied to claim 1). The graphite nuclear has mean grain size of 50-150 microns, and contains solid carbon more than 98% (para. 12 as applied to claim 2). The forming material contains said graphite nuclear of 55 ~ 91 mass percent, said hardening resin of 9 to 25 mass percent and carbon nano-substance of 3 to 30 mass percent (para. 11 as applied to claim 3). The carbon nano-substance is carbon nano-fiber (para. 14 as applied to claim 4). The hardening resin is phenol resin (para. 13 as applied to claim 5). Yoshida teaches of a nearly identical process wherein the separator is formed by pressing the material into a desired shape (se Figs. 1 and 2) and forms the product by a nearly identical process (see para. 33 as applied to claim 6).

7. Claims 1 and 4-6 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 1061597 (Takano '597).

Takano teaches of a forming a fuel cell separator by mixing graphitized MCMB with 10-35wt% of a resin and 1-40wt% of a carbon material, including fine carbon fibers. Given the ratio of the various materials wherein the MCMB constitute the majority of the

Art Unit: 1795

mixture, the minor resin and carbon material will expectedly form at least partial coatings on the MCMB (abstract as applied to claim 1).

The addition of the carbonaceous material in a range of 1-40wt% is shown to significantly decrease the specific resistance and volume resistivity of the separator (para. 35). The carbon fine powder is described as "carbon nanofibers" (paras. 35-41 as applied to claim 4).

Takano teaches that the combination of the resin and fine carbon powder improves the conductivity of the fuel cell separator (page 3, ll. 40-43). The resin material can be a variety of materials including phenols and epoxies with phenol resins being preferred (paras. 30-31 as applied to claim 5).

Takano teaches of a nearly identical process wherein the separator is formed by pressing the material into a desired shape (see abstract) and forms the product by a nearly identical process (see examples as applied to claim 6).

### ***Claim Rejections - 35 USC § 102/103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

Art Unit: 1795

2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
8. Claim 7 is rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yoshida as applied to claims 1-6 above.

The teachings of claims 1-6 with respect to Yoshida have been discussed above and are incorporated herein.

Regarding claim 7, this claim is held to be product-by-process claims. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In *re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

“The Patent Office bears a lesser burden of proof in making out a case of *prima facie* obviousness for product-by-process claims because of their peculiar nature” than when a product is claimed in the conventional fashion. In *re Fessmann*, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In *re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292

Art Unit: 1795

(Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). See MPEP section 2113.

Yoshida teaches of a nearly identical process wherein the separator is formed by pressing the material into a desired shape (see Figs. 1 and 2) and forms the product by a nearly identical process (see para. 33). Therefore the product of Yoshida is held to be the same product as that recited in claim 7. If the claimed product in the product-by-process of claim 7 is shown to be different from the product of the prior art of Yoshida based on the particular claimed process conditions of claim 7, such differences would have been minor and obvious to one of ordinary skill in the art.

***Claim Rejections - 35 USC § 103***

9. Claim 2 is rejected under 35 U.S.C. 103(a) as obvious over EP 1061597 (Takano) as applied to claim 1 above and further in view of U.S. Patent Application Publication No. 2003/0129471 (Kitade).

The teachings of claim 1 with respect to Takano have been discussed above and are incorporated herein.

The graphite nuclear has mean grain size of 50 microns which falls within the lower portion of the approximate range of 50~150 microns of claim 2.

Takano does not teach that the graphite contains fixed carbon more than 98%.

Kitade teaches that it is desirable to eliminate volatile components from the carbonaceous material used in a separator and that the fixed carbon content is preferably 98% by weight or more (para 29).



Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Takano by selecting the fixed carbon content in the carbonaceous material of the separator to be 98% or more as taught by Kitade since it would have eliminated volatile components from the separator and improved the surface smoothness of the separator.

10. Claim 3 is rejected under 35 U.S.C. 102(a) under 35 U.S.C. 103(a) as obvious over EP 1061597 (Takano) as applied to claim 1 above.

The teachings of claim 1 with respect to Takano have been discussed above and are incorporated herein.

As discussed above, Takano teaches of a forming a fuel cell separator by mixing graphitized MCMB with 10-35wt% of a resin and 1-40wt% of a carbon material, including fine carbon fibers (abstract). The ratio of graphite to resin to carbon material is about 100 wt% graphite microbeads to about 10-35wt% resin and 1-40wt\$ carbon (col. 2, ll. 55-60).

The general teaching of Takano is to have a significantly higher amount of the graphite beads relative to the resin and carbon material. The amounts of each of the materials in Takano significantly overlap the range of claim 3 and any differences in the ranges are held to be minor and obvious. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). It has been held that when

Art Unit: 1795

the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

11. Claim 7 is rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over EP 1061597 (Takano) as applied to claim 1 and 4-6 above.

The teachings of claims 1 and 4-6 with respect to Takano have been discussed above and are incorporated herein.

Regarding claim 7, this claim is held to be product-by-process claims. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

“The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature” than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to

Art Unit: 1795

come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). See MPEP section 2113.

Takano teaches of a nearly identical process wherein the separator is formed by pressing the material into a desired shape (see abstract) and forms the product by a nearly identical process (see examples and Table data). Therefore the product of Takano is held to be the same product as that recited in claim 7. If the claimed product in the product-by-process of claim 7 is shown to be different from the product of the prior art of Takano based on the particular claimed process conditions of claim 7, such differences would have been minor and obvious to one of ordinary skill in the art.

12. Claims 1 and 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0146613 (Otawa) in view of either EP 1061597 (Takano) or U.S. Patent No. 6,544,680 (Takano '680).

Otawa discloses a forming material of separator for fuel cell, characterized in that said forming material is comprised of an aggregation of granular composites, wherein each granular composite is a graphite nuclear coated by a coating layer consisting of hardening resin (abstract and Fig. 1 as applied to claim 1). The hardening resin is phenol resin (para. 29 as applied to claim 5). Ottawa teaches of a nearly identical process wherein the separator is formed by pressing the material into a desired shape (see Figs. 1 and 2) and forms the product by a nearly identical process (see para. 33 as applied to claim 6).

Otawa teaches of a nearly identical process wherein the separator is formed by pressing the material into a desired shape (see Figs. 2 and 3) and forms the product by a nearly identical process (see para. 16). Therefore the product of Ottawa is held to be the same product as that recited in claim 7. If the claimed product in the product-by-process of claim 7 is shown to be different from the product of the prior art of Ottawa based on the particular claimed process conditions of claim 7, such differences would have been minor and obvious to one of ordinary skill in the art.

Otawa does not teach of the addition of a carbon nano-substance in the coating (claim 1) or of the ratio of the graphite core, resin and carbon nano-substance (claim 3).

Takano '680 teaches of a forming a fuel cell separator by mixing graphitized MCMB with 10-35wt% of a resin and 1-40wt% of a carbon material, including fine carbon fibers (abstract). The ratio of graphite to resin to carbon material is about 100 wt% graphite microbeads to about 10-35wt% resin and 1-40wt% carbon (col. 2, ll. 55-60).

Takano '680 teaches that the combination of the resin and fine carbon powder improves the conductivity of the fuel cell separator (col. 3, ll. 24-26). The resin material can be a variety of materials including phenols and epoxies (col. 4, ll. 49-67) with phenol resins being preferred (col. 4, ll. 64-67).

The addition of the carbonaceous material in a range of 1-40wt% is shown to significantly decrease the specific resistance and volume resistivity of the separator (col. 5, ll. 27-33). The carbon fine powder is described as "carbon nanofibers" (col. 6, ll. 13-35).

Art Unit: 1795

The same teachings can be found in the EP version of Takano discussed above and incorporated herein.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Otawa by adding carbon nanofibers to the coating as suggested by either Takano or Takano '680 since it would have improved the conductivity of the separator and would have significantly decreased the specific resistance and volume resistivity of the separator.

Regarding the mass percent composition of claim 3:

As discussed above, each of Takano and Takano '680 teaches of a forming a fuel cell separator by mixing graphitized MCMB with 10-35wt% of a resin and 1-40wt% of a carbon material, including fine carbon fibers (abstract). The ratio of graphite to resin to carbon material is about 100 wt% graphite microbeads to about 10-35wt% resin and 1-40wt% carbon (col. 2, ll. 55-60).

The general teaching of either Takano or Takano '680 is to have a significantly higher amount of the graphite beads relative to the resin and carbon material. The amounts of each of the materials in Takano significantly overlap the range of claim 3 and any differences in the ranges are held to be minor and obvious. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

It has been held that when the difference between a claimed invention and the

Art Unit: 1795

prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

Regarding claim 7, this claim is held to be product-by-process claims. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

“The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature” than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). See MPEP section 2113.

Art Unit: 1795

13. Claim 2 is rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ottawa in view of either Takano or Takano '680 as applied to claim 1 above and further in view of U.S. Patent Application Publication No. 2003/0129471 (Kitade).

The teachings of claim 1 have been discussed above and are incorporated herein.

The graphite nuclear has mean grain size of 50-150 microns (paras. 16 and 28 as applied to claim 2).

Ottawa does not teach that the graphite contains solid carbon more than 98%.

Kitade teaches that it is desirable to eliminate volatile components from the carbonaceous material used in a separator and that the fixed carbon content is preferably 98% by weight or more (para 29).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Ottawa by selecting the fixed carbon content in the carbonaceous material of the separator to be 98% or more as taught by Kitade since it would have eliminated volatile components from the separator and improved the surface smoothness of the separator.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:30-6:30.

Art Unit: 1795

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Gregg Cantelmo/  
Primary Examiner, Art Unit 1795